

비납계 $[\text{Bi}_{1-x}(\text{Na}_{0.7-x}\text{K}_{0.2}\text{Li}_{0.1})]_{0.5}\text{Ba}_x\text{TiO}_3$ 압전 세라믹의 압전-유전특성

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Piezoelectric and Ferroelectric Properties of $[\text{Bi}_{1-x}(\text{Na}_{0.7-x}\text{K}_{0.2}\text{Li}_{0.1})]_{0.5}\text{Ba}_x\text{TiO}_3$ Lead-Free Piezoelectric Ceramics

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Abstract : The structural, dielectric and piezoelectric properties of $[\text{Bi}_{1-x}(\text{Na}_{0.7-x}\text{K}_{0.2}\text{Li}_{0.1})]_{0.5}\text{Ba}_x\text{TiO}_3$ (BNKLBxT) ceramics were studied for the compositional range, $x = 0-0.08$. The samples were prepared by conventional sintering technique. The result of X-ray diffraction (XRD) suggest that Ba^{2+} diffuse into the $[\text{Bi}(\text{Na}_{0.7}\text{K}_{0.2}\text{Li}_{0.1})]_{0.5}\text{TiO}_3$ (BNKLT) lattices to form a solid solution with a single phase perovskite structure. The ceramic show excellent piezoelectric and ferroelectric properties, and optimum properties measured are as follows: piezoelectric constant $d_{33}=230\text{pC/N}$, planar electromechanical coupling factor $k_p = 40.3\%$, remanent polarization $P_r = 30 \mu\text{C/cm}^2$, and coercive field $E_c = 2.5 \text{ kV/mm}$, respectively.

Key Words : BNKLT-BT ceramics, Lead-free, Piezoelectric properties